# *The SBIR & STTR Programs at the Department of Energy*

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# Outline

- Introduction to the DOE SBIR/STTR Programs
  - Research Areas
  - Operation
  - Outcomes
- Recommendations from the Previous Assessment
- Output from this Assessment

# U. S. Department of Energy Mission

- **The mission of the Department of Energy** is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions.
  - **Goal 1:** Catalyze the timely, material, and efficient transformation of the nation's energy system and secure U.S. leadership in **energy** technologies.
  - **Goal 2:** Maintain a vibrant U.S. effort in **science and engineering** as a cornerstone of our economic prosperity, with clear leadership in strategic areas.
  - **Goal 3:** Enhance **nuclear security** through defense, nonproliferation, and environmental efforts.

ARPA-E

**Operates its SBIR/STTR Programs Independently**

**Program Offices Participating in the DOE SBIR/STTR Programs**

- Electricity Delivery & Energy Reliability
- Energy Efficiency & Renewable Energy
- Fossil Energy
- Nuclear Energy
- Advanced Scientific Computing Research
- Basic Energy Sciences
- Biological & Environmental Research
- Fusion Energy Sciences
- High Energy Physics
- Nuclear Physics
- Defense Nuclear Nonproliferation
- Environmental Management

# Program Goals

**Small Business Innovation Research (SBIR)** *est. 1982*

- Stimulate technological innovation
- Use small business to meet Federal R&D needs
- Foster and encourage participation by women and socially and economically disadvantaged persons in technological innovation
- Increase private-sector commercialization of innovations derived from Federal R&D

**Small Business Technology Transfer (STTR)** *est. 1992*

- Stimulate and foster scientific and technological innovation through cooperative research and development carried out between small business concerns and research institutions
- Foster technology transfer between small business concerns and research institutions

*SBIR and STTR were reauthorized on December 23, 2016 (P.L. 114-840) through September 30, 2022*

# Use of the SBIR/STTR Programs

- Electricity Delivery & Energy Reliability
- Energy Efficiency & Renewable Energy
- Fossil Energy
- Nuclear Energy

→ New Energy Technologies including materials, components, systems

- Advanced Scientific Computing Research
- Basic Energy Sciences
- Biological & Environmental Research
- Fusion Energy Sciences
- High Energy Physics
- Nuclear Physics

→ Advanced Scientific Instrumentation including detectors, accelerators, data acquisition and analysis

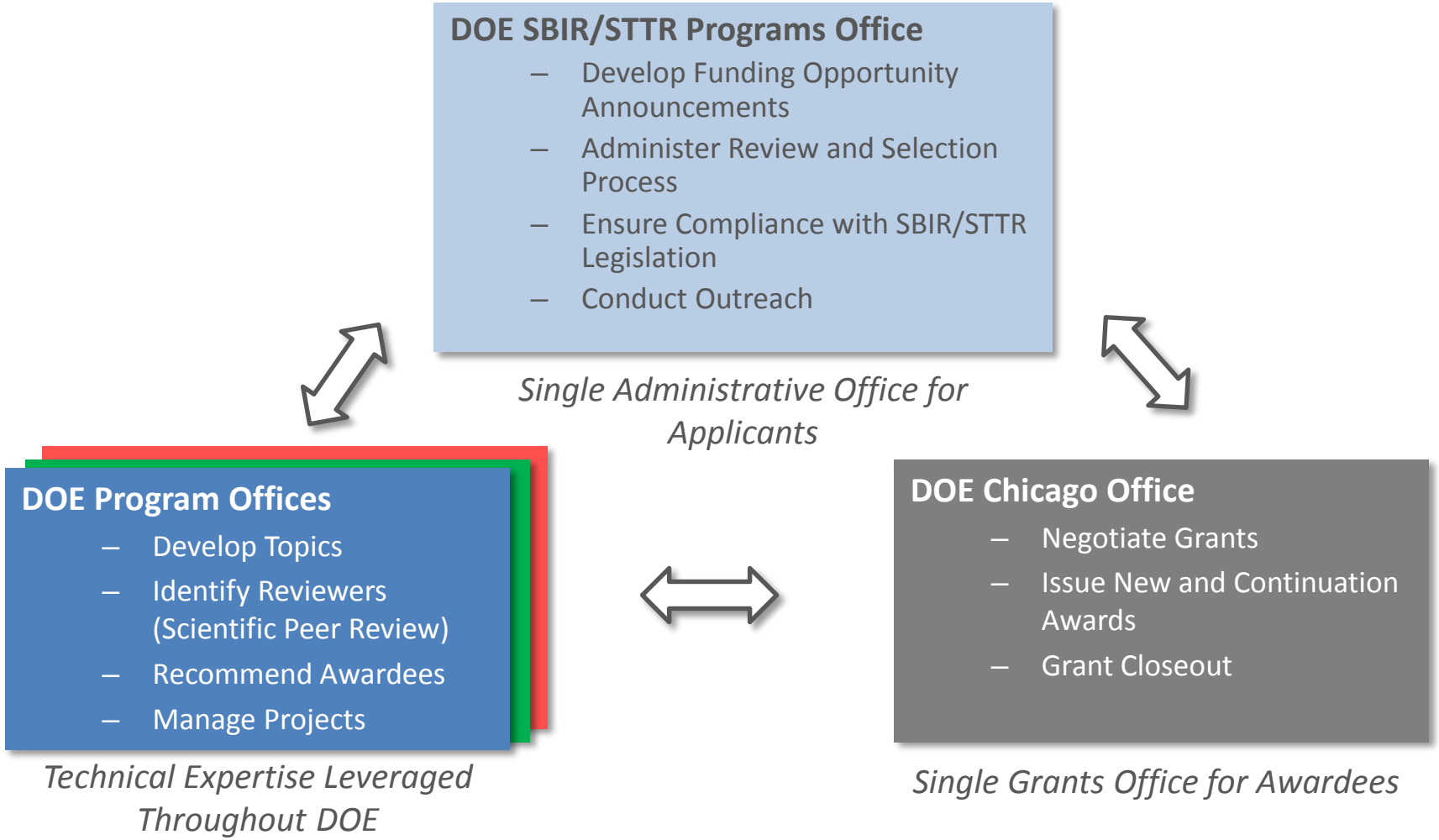
- Defense Nuclear Nonproliferation
- Environmental Management

→ New Detection and Remediation Technologies

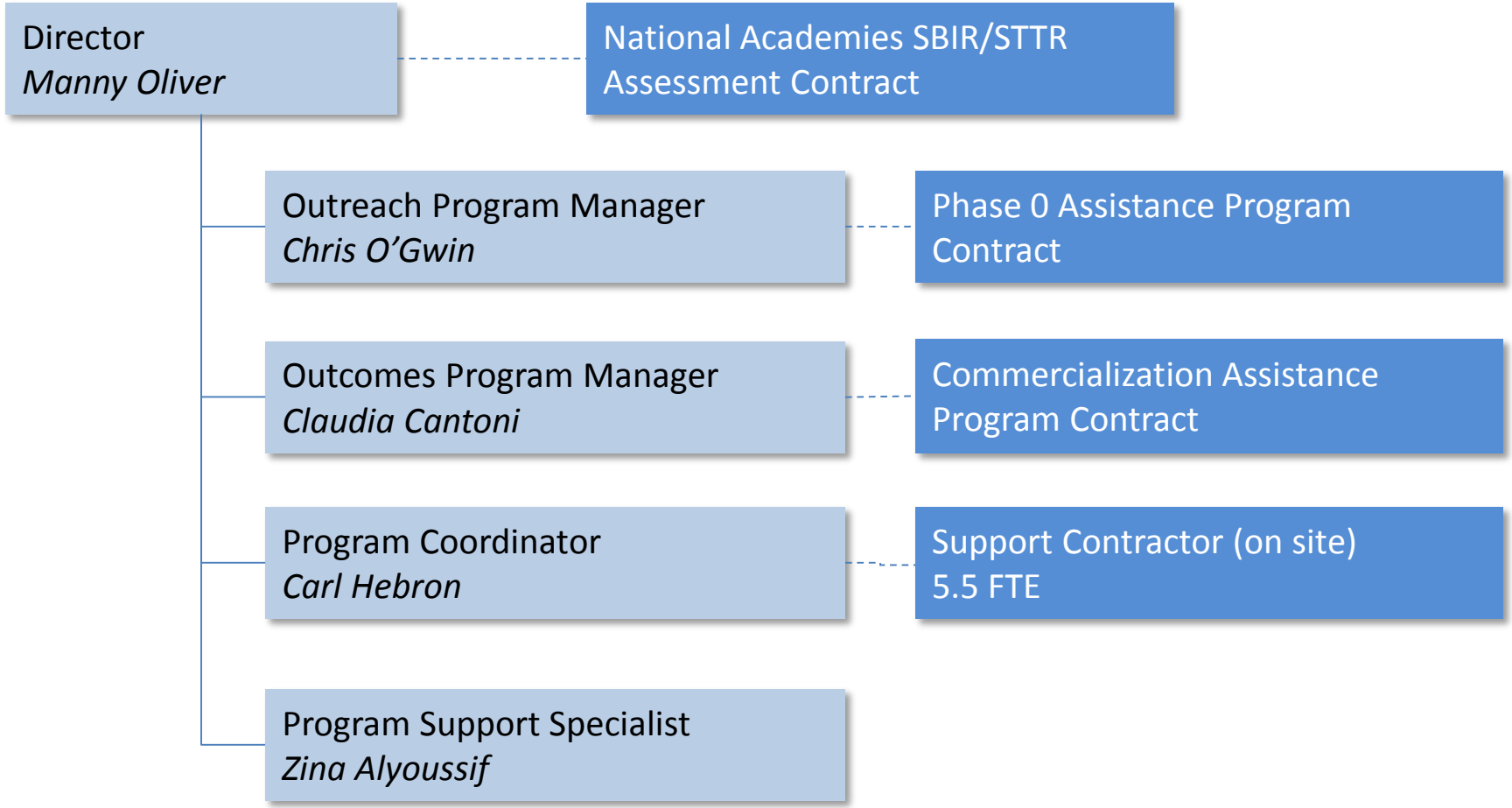
# DOE Issues Grants for SBIR/STTR

- Grants are utilized when the R&D is for public benefit
  - Contracts are used when the agency is the primary beneficiary
- DOE is not the intended to be the primary customer
  - Burden is on the small business to define the commercialization opportunity
  - There are limited commercialization opportunities for scientific instrumentation at DOE Labs

# Operation of the DOE SBIR and STTR Programs



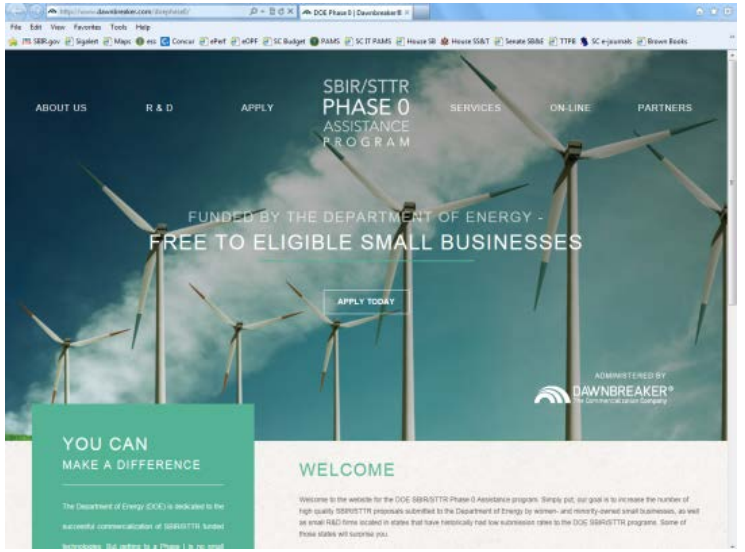
# DOE SBIR/STTR Programs Office



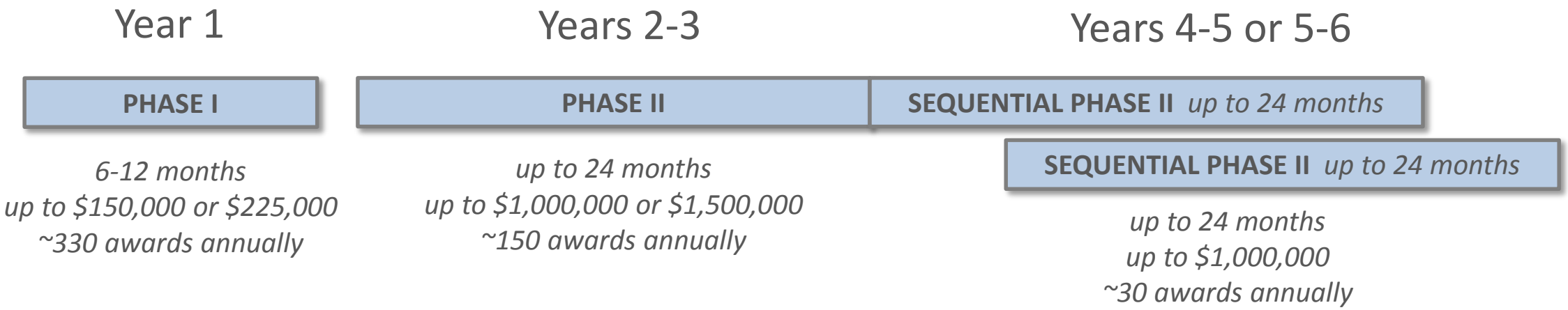
# Outreach

- Traditional In-person Meetings
  - SBIR/STTR National and Regional Conferences
  - SBIR Road Tour
  - State & Local Events
- Webinars
  - Topic Webinars with DOE Program Managers
  - Funding Opportunity Announcement Webinars
- Videoconferencing
  - Cost-effective one-on-one meetings with potential applicants

- Phase 0 Assistance Program
  - Goal: increase the number of responsive, high quality proposals from under-represented groups



# Award Sequence




- Two annual Phase I & II Funding Opportunity Announcements
- Sequential Phase II allows flexibility to provide up to 5 years of R&D funding

# Phase I Review Process

| Letter of Intent | DOE program manager review | Phase I Application | external technical merit review | Phase I Awards |
|---|---|---|---|---|
| ~2800 annually | *evaluates responsiveness to topic* | ~1600 annually | *3 technical reviewers evaluate*<br>• *the proposed innovation*<br>• *the team*<br>• *impact* | ~330 annually |

- Letters of intent
  - Identifies responsive innovations and reduces the application review workload
  - Enables early identification of reviewers to reduce the time between application and award (< 90 days)

# Phase II Review Process

| Phase II Application | external technical merit review | commercialization review | Phase II Awards |
|---|---|---|---|
| ~300 annually | *3+ technical reviewers evaluate*<br>• *the proposed innovation*<br>• *the team*<br>• *impact* | *1 business development reviewer evaluates the commercialization plan* | ~150 annually |

- Commercialization review
  - Ensures the small business has identified a credible commercialization path

# Commercialization

- DOE topics are drafted by program managers who are aware of the technology roadblocks but may not be aware of the commercialization challenges
- Small business applications are expected to address the commercialization challenges and ensure that there is a profitable business opportunity
  - Phase I & II Applications must include Commercialization Plans
  - Commercialization Plans accommodate long commercialization timeframes:  emphasis on first 10 years of commercialization beginning with first sale

# Commercialization Assistance

- Small businesses have the option to use a DOE contractor or identify their own consultant
- Up to $5000 in Phase I or $5000/year in Phase II
- Typically ~75% awardees utilize the DOE contractor
- DOE Commercialization Contractor
  - Phase I assistance
    - Assistance with development of Phase II commercialization plans
    - Or, Industry-specific business consultant
  - Phase II assistance
    - Flexible offerings to meet  a variety of commercialization needs
    - Or, Industry-specific business consultant
  - Vendor website:  http://www.larta.org/doecap

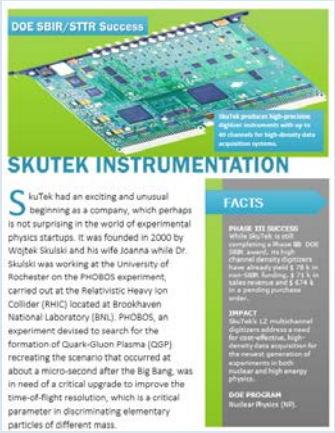
# Outcomes

- Overall, the previous National Academies study found that DOE outcomes were similar to those from other agencies

  - **Nearly half of the respondents reported some sales, and a further 23 percent reported anticipating future sales.**
  - **78% of respondents reported receiving additional investment funding in the technology related to the surveyed project.**
  - **71% of respondents reported that the project probably or definitely would not have proceeded without SBIR/STTR funding.**
  - **45% of companies indicated that the company was founded entirely or in part because of the SBIR/STTR programs.**
  - **61% of respondents indicated that the DoE SBIR/STTR programs "had a highly positive or transformative effect" on their company**

# Case Studies and Success Stories

- DOE added a fifth staff member in 2016 to better collect and analyze outcomes data
- Case studies
  - Internal, in-depth studies designed to understand small business challenges and improve program management
- Phase III success stories
  - Illustrate the varied commercialization paths taken by awardees
  - Provide insights and guidance to current awardees






# Recommendations from Previous National Academies Assessment

21 recommendations were made in five areas

I. Improving Monitoring, Evaluation, and Assessment

II. Addressing Underserved Populations

III. Improving Commercialization Outcomes

IV. Improving Linkages to National Laboratories

V. Improving Program Management

# I. Improving Monitoring, Evaluation and Assessment

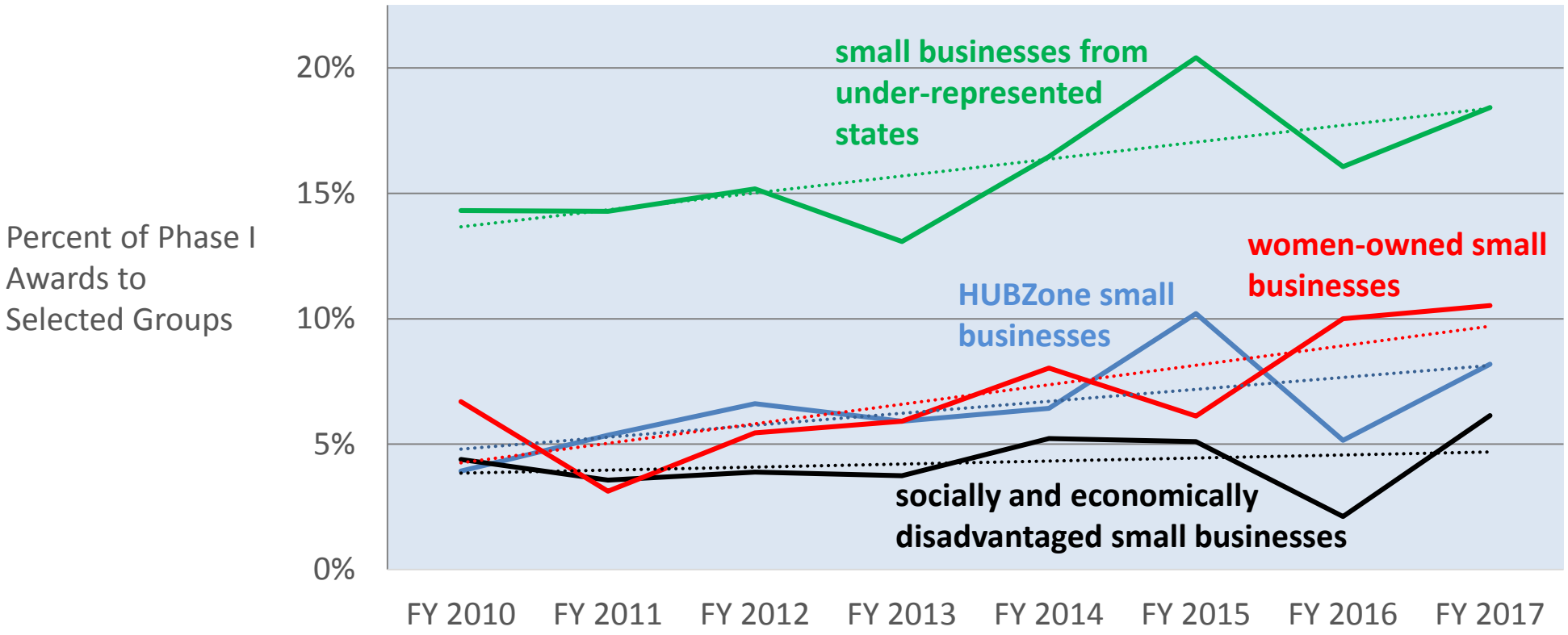
- Data Collection
  - New staff member focused on case studies and success stories
  - SBA Commercialization Working Group
  - Collection of PI gender, race, and ethnicity information
- Evaluation
  - Evaluations/Surveys used on program elements
  - Improving Robustness of Conclusions obtained from National Academies Assessments
- Assessment
  - Additional Annual Report Requirement?

# II. Addressing Underserved Populations

***"the objective of fostering the participation of women and underserved minorities has not been met by the DoE SBIR/STTR programs"***

- Benchmarks and Metrics
  - Need for understanding our small business applicant pool and historical trends
- Outreach and Education
  - Phase 0 Application Assistance Program for under-represented groups
- Selection and Bias
  - Plan to learn from other agency efforts in this area

# Participation by Under-represented Groups



# III. Improving Commercialization Outcomes

- Commercialization Assistance
  - Revamped DOE Commercialization Assistance Program in FY 2017
- Support Beyond Phase II
  - Sequential Phase II
  - Congressional action required to restore administrative funding and commercialization readiness pilot programs

# IV. Improving Linkages to National Laboratories

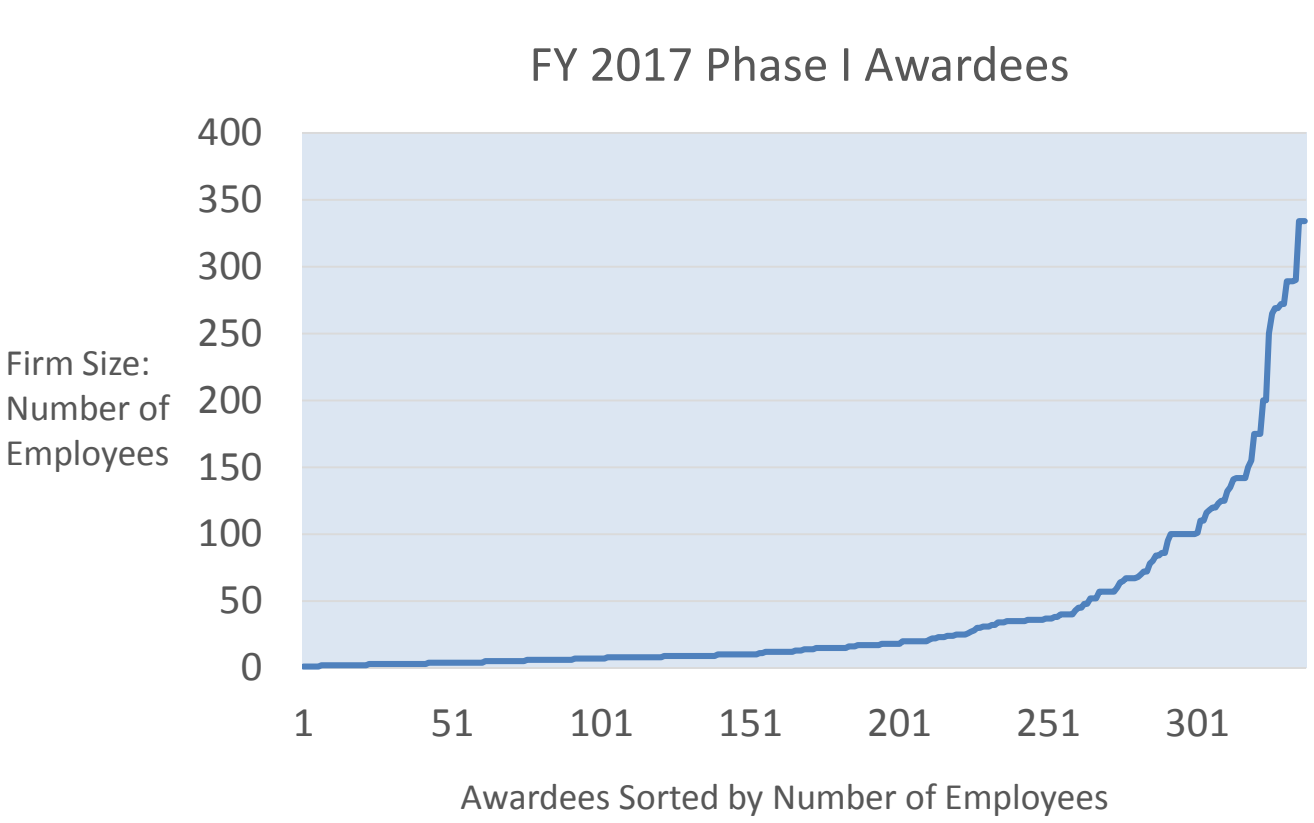
**"National Laboratories generally do not make good formal partners for small business concerns"**
**"DoE SBIR and STTR programs have not made sufficient efforts to enhance collaborations between the National Laboratories and small innovative firms"**

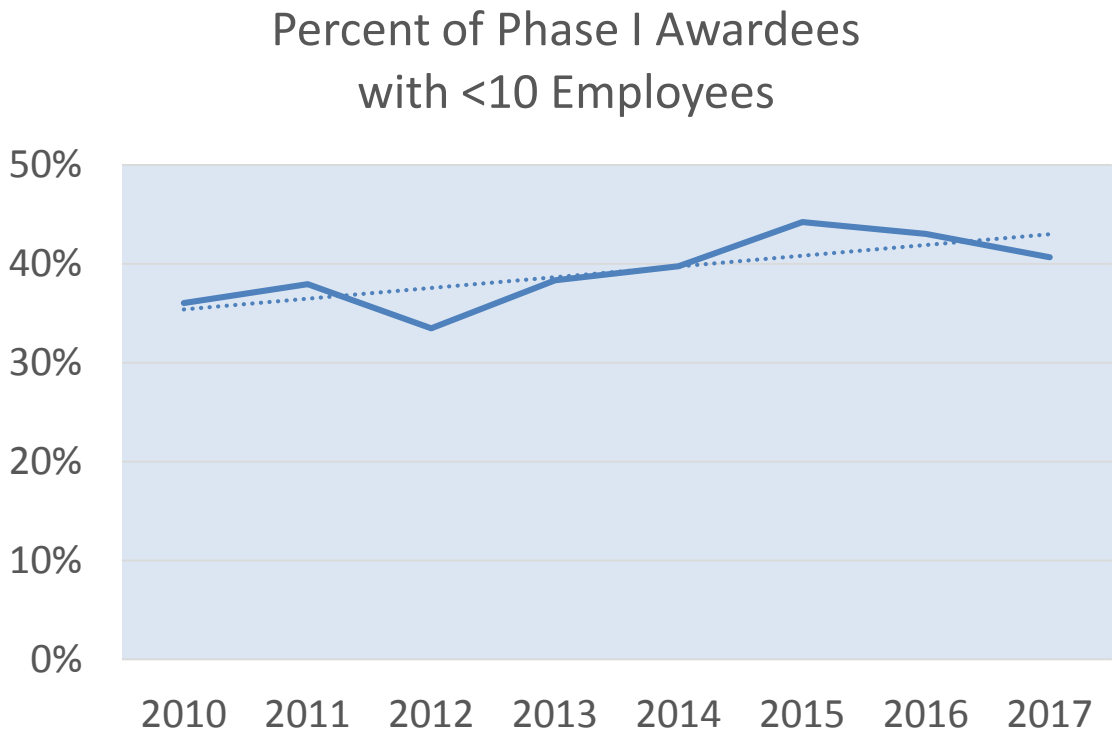
- Current Strategy
  - National Labs provide input on topics related to advanced scientific instrumentation
  - However, they provide rather limited commercialization opportunity
  - Most commercialization opportunities lie in adjacent commercial markets

# V. Improving Program Management

- Topic Development
  - Evaluating commercial potential of topics?
- Funding Distribution
  - Topics driven by mission areas not size of commercial market
- Application Content and Review
  - How much emphasis to place on commercialization in Phase I & II applications?
  - Is there a singe type of desired applicant that gives higher success?

# DOE Phase I Awardee Size



# New Study: Statement of Task

- Economic benefits
- Noneconomic benefits
  - How do we define and capture these on a systematic basis?
- Stimulates technological innovation; meets Federal research and development needs
- Collaborations between small businesses and research institutions
  - How are small business and research institution collaboration formed? How can agencies further enhance the formation of these collaborations to benefit the SBIR and STTR programs?
- Technology Transfer
  - What is the origin of innovations funded by the SBIR program? of the STTR program?
  - What are effective strategies for fostering the use of SBIR and STTR for technology transfer?

# New Study Statement of Task (continued)

- Fulfill procurement needs
- Expansion of the STTR program
  - Is there really a need for a separate STTR program?
- Assess transition rate benchmarks
  - Are these fulfilling a need?
- Outreach
  - What outreach strategies are most effective? particularly for under-represented groups? How did current awardees find out about the programs?
  - What are the demographics our applicant pool and how are they evolving over time? How much of the potential applicant pool is aware of the SBIR/STTR programs? How many firms are entering and exiting the applicant pool each year?
  - How do we foster research collaboration for new applicants?

# Statement of Task (continued)

- Award selection processes; commercialization assistance and sequential Phase II awards
  - What application information is predictive of successful Phase III outcomes?
  - What other factors should be considered that enhance or hinder III success (e.g. availability of investment capital)?
  - How effective is commercialization assistance provided during Phase I & II in enhancing Phase III success? Would increasing these amounts significantly improve outcomes?
  - Are Sequential Phase II awards effective in advancing Phase III success?

# Data Challenges: Application Information

- DOE SBIR/STTR Funding Opportunity Announcements are constructed so that SBIR/STTR application information is only to be used for the purpose of selecting awardees
  - There is no provision for use of application information for program evaluation or other purposes
  - Awardee information contained in the public database maintained by SBA
- DOE is required by statute [15 USC 638 (k)(2)(A)] to submit SBIR/STTR application information to SBA as part of its government database
  - Database was created in FY 2017
  - DOE has uploaded FY 2016-FY 2017 application information; plan to upload FY 2012-2015 data during 2018
- The government database is to be used solely for program evaluation purpose [15 USC 638 (k)(2)(F)]

# APPENDIX

# 15 USC 638 (k)(2)(A)

**(2) Government database**

Not later than 90 days after December 31, 2011, the Administrator, in consultation with Federal agencies required to have an SBIR program pursuant to subsection (f)(1) of this section or an STTR program pursuant to subsection (n)(1) of this section, shall develop and maintain a database to be used exclusively for SBIR and STTR program evaluation that—

(A) contains for each small business concern that applies for, submits a proposal for, or receives an award under Phase I or Phase II of the SBIR program or the STTR program—

(i) the name, size, and location of, and the identifying number assigned by the Administration to, the small business concern;

(ii) an abstract of the applicable project;

(iii) the specific aims of the project;

(iv) the number of employees of the small business concern;

(v) the names and titles of the key individuals that will carry out the project, the position each key individual holds in the small business concern, and contact information for each key individual;

(vi) the percentage of effort each individual described in clause (v) will contribute to the project;

(vii) whether the small business concern is majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms; and

(viii) the Federal agency to which the application is made and contact information for the person or office within the Federal agency that is responsible for reviewing applications and making awards under the SBIR program or the STTR program;

# 15 USC 638 (k)(2)(F)

(F) is available for use solely for program evaluation purposes by the Federal Government or, in accordance with policy directives issued by the Administration, by other authorized persons who are subject to a use and nondisclosure agreement with the Federal Government covering the use of the database